READY…SET…GO!

GETTING STARTED ON YOUR SCIENCE FAIR PROJECT

Picking Your Project

You are on track to finding the correct project if:
1. You have found a topic that interests you – i.e. it's something you like to think and/or read about
2. You can do a test to find an answer to a question

Remember the scientific method is a way to ask and answer scientific questions by making observations and doing experiments.

The steps of the scientific method are to:

- o Ask a Question
- o Make Observations and Do Background Research
- o Construct a Hypothesis
- o Test Your Hypothesis by Doing an Experiment
- o Analyze Your Data and Draw a Conclusion
- o Communicate Your Results

Project Idea Websites:

- Science Buddies Topic Selection Wizard: http://www.sciencebuddies.com/science-fair-projects/recommender_register.php
- All Science Fair Projects: http://www.all-science-fair-projects.com
- MiniScience.com
- Discovery Channel: http://school.discoveryeducation.com/sciencefaircentral/
- Energy Experiments: http://www.energyquest.ca.gov/projects/index.html
- Bill Nye's Home Demos: http://www.billnye.com/
- PBS: http://pbskids.org/zoom/activities/sci/

Important Notes:

- This year, every student or group will be creating a trifold board.
- You may work alone or in groups of up to three people. If you choose to work in a group, you create one board presentation. However, every student must write his or her OWN lab report.
- If you choose to work in a group, your group members must be in the same science period!!

Important Dates:

- Nov. 19 – Proposal Worksheet due
- Dec. 4 – Variables and Hypothesis Worksheet due
- Jan. 21 – Written Lab Reports due
- Jan. 25-29 – In class oral presentations
- Feb. 4 – Middle School Science Fair (Board due today)

What Makes a Good Science Project?

Here's some advice from a science fair judge....

SCIENCE PROJECTS

You're handed the dreaded assignment...the Science Project. Maybe you already know what you want to do or maybe you're clueless. Whatever you decide, here are steps you should consider when doing your project. Doing it right will not only get a thumbs up from your teacher but it may give you the boost to go to a DC Science Fair.

BE FRESH!

Judges always look for original ideas. Original projects are those that take the textbooks one step further by exploring new ground and innovative techniques. Your project could be original in the scientific concept or maybe you've come up with a new way to solve an old problem or a new and better way to interpret the data. Whatever your project, make sure it is done well. Just having a great and new idea is only half of the solution.

PASSING THE "HUH?" TEST!

It may be a super idea for a project but it won't impress the judges if you don't have a well-defined goal or objective of what you're doing. Just what scientific concept are you trying to prove or disprove with your project? A direct, often simple objective won't leave the judges scratching their heads, trying to figure out what exactly you were trying to prove. You've got to pass the "HUH?" test.

UNDERSTAND IT - IT'S YOUR PROJECT

Your project must show the judges that YOU understand and know how to use scientific theory, terms, techniques and methods properly. Judges look for students who know about the scientific principles and practices they used in their project. It's important for judges to know that you have a depth of understanding of the basic science behind the project topic, that you comprehend the finer level of detail and that you're aware of any influence the project has on related subject topics. If you don't know what a term or theory means... find out or don't use it in your presentation.

Keep your project at a level YOU can understand. Judges aren't expecting you to have access to university research laboratories or be a Ph.D. candidate for the topic area you've chosen. What is important is that the technical level of sophistication and complexity of your project reflect YOUR level of understanding - not someone else's. It's OK to receive help outside your school as long as you clearly say what it was and who helped you. IF YOU DON'T UNDERSTAND IT, DON'T DO IT because you won't be able to explain it! Chances are if it doesn't make sense to you, it won't make sense to the judge.

One more thing... know how all your equipment works, what it does and why it was used in your project. If you can't explain it to a judge, then you probably don't understand the science of what's going on.

PROVE YOUR POINT!
Judges look for complete projects. That is, projects that are thorough in addressing the original question and thorough in answering other questions that come up during the experimentation process. As a scientist, it is your responsibility to provide all evidence to support whatever claims you are making. It isn't up to the judge or other scientists to prove your claim. Without data or results that support your claims, it's not a completed work.

PUT SOME TIME (and FUN) IN!
How much time and energy have you put into your project? Was it a one-hour wonder or did you actually put in some effort and time? Did you fly by the seat of your pants or did you spend time reading and learning the subject? Either way, it will show. Pick a topic you like. Science is found everywhere. There must be something you enjoy that can be used as part of a science project. Think outside the box and have some fun with your project!

A judge considers time and effort as two important factors in a successful project. Judges can usually tell that the amount of effort that goes into your project reflects your motivation. Because if you're not motivated, you won't enjoy the experience and that shows!

CLEAR AS GLASS!
If nobody understands what you were doing with your project, why bother with all that work? Be crystal-clear in both your written and verbal communication skills. Your ideas should be clearly presented and easy to understand. Judges look for well-written abstracts and presentations with easy to follow visual aids and clear and concise answers. Remember, the more you understand about the scientific principles, the easier it is for you to explain it in terms everyone understands. KISS (Keep It Simple, Scientist!)

WRAP-UP
To sum this up, remember high marks go to:

* Clever experimental setup or procedure
* Correctly interpreting data
* Discovering knowledge not readily available to you
* Combining good research and experimentation
* Repeating steps to verify experimental results
* Predicting and/or analyzing experimental results with analytical techniques
* Experiments that have a real world application
* Your ability to clearly portray and explain your project and its results
* Genuine scientific breakthroughs

QUESTIONS

Judges and those attending the science fair will ask questions about your project. Dazzle them with your brilliance and be prepared to answer questions like these:

- How did you come up with the idea for this project?
- What did you learn from your background search?
- How did you build the equipment you used for your experiment? How does it work?
- How much time (or many days) did it take to run the experiments (grow the plants or collect each data point)?
- How many times did you run the experiment?
- Did you try something else that didn't work?
- Can you explain to me how your project relates to (some scientific principle)?
- What could you or others do with this knowledge?
- Were there any books that helped you do your analysis?
- When did you start this project? Or how much of the work did you do this year?
- What is the next experiment to do if you want to continue this study?

Source: http://www.energyquest.ca.gov/projects/advice.html

Note from Teacher:

Once you have picked a project, turn in your signed project proposal sheet along with your background info and bibliography forms. To ensure we are not all doing the same **project only three of a particular project will be allowed**. For example, only three students or student groups can investigate how gravity affects the direction in which plants grow. This will work on a "first come, first serve" basis so once you have chosen your project be sure to turn it in immediately to ensure that you will be able to conduct the experiment you chose. If you pick a project that has already been selected by three students or student groups, I will work with you in selecting a new project for the fair.

Please keep in mind the due dates listed on page 1. While you will receive reminders before each date, you are always welcome to work ahead and turn in assignments in advance. I would encourage you to start early, and work on this project a little at a time. The best projects are those that are not rushed at the end. Take pride in your work; you will be presenting this to your peers, teachers, and to judges from the scientific community.

Good Luck!!

Name _____

Overall Score:

Science Fair Rubric

_____ **Prep Work (10)**

_____ Proposal (5)

_____ Variables and Hypothesis (5)

_____ **Report (50)**

_____ Background Research (8 – detailed, relevant; 5 – relevant, less specific; 2 – included)

_____ Introduction (1 – Purpose/Question, 2 – IV, 2 – DV, 2 – Constants)

_____ Hypothesis (4; 2 – without because; 1 – included)

_____ Materials (4 – complete; 2 – missing no more than 2; 1 – included)

_____ Procedure (8 – detailed, repeatable; 4 – less specific; 2 – included)

_____ Data (6 – organized, all included; 3 – some missing OR not organized; 1 – attempts)

_____ Conclusion (1 – Recap, 1 – Purpose, 3 – Results/Hypo, 1 – Error, 1 – Next Question)

_____ Bibliography (6 – APA; 2 – included)

_____ **Board (20)**

_____ Content (10 – all, 1 point each otherwise)

(Title, Question, Variables, Hypothesis, Materials, Procedure, Data/Graph, Conclusion)

_____ Readability (5 – font is neat & large enough to be read from several feet away)

_____ Professional and Creative (5 – neat, colorful, ordered)

_____ **Oral Presentation (20)**

_____ Content Knowledge (8 – full understanding, describes in detail, answers questions)

_____ Presentation Organization (On Topic, Logical Order – 4)

_____ Time Limit (4-6 minutes – 3)

_____ Professionalism (Uniform, Posture, Eye Contact, Clear Speech, Volume – 5)

Final Report Checklist

Name: _____

☐	Does your abstract include a short summary of the hypothesis, materials & procedures, results, and conclusion?
☐	Have you used the proper capitalization and punctuation?
☐	Have you checked your grammar and spelling?
	Does your final report include the following key sections:
☐	- Title page
☐	- Abstract (optional for Class; Required for DC STEM Fair)
☐	- Table of contents
☐	- Question, variables, and hypothesis
☐	- Background research (your Research Paper)
☐	- Materials list
☐	- Experimental procedure
☐	- Data analysis and discussion (including data tables and graphs)
☐	- Conclusions
☐	- Acknowledgements
☐	- Bibliography

Due 12/4

Variables & Hypothesis Worksheet

Name: _____

Variables *(Fill in the table with the appropriate information from your own experiment)*		
Independent Variable *(What will you be changing in the experiment. Note: There should only be one item listed here)*	**Dependent Variables** *(What will you be measuring or observing)*	**Controlled Variables** *(What will you be keeping the same during the experiment)*

Your Hypothesis

(Fill in the blanks with the appropriate information from your own experiment.)

If [*I do this*] _____

_____,

then

[*this*]_____

_____

will happen because _____

_____

Due 11/19

Science Project Proposal Form

Name: _____

The question I plan to investigate in my experiment (*please phrase as a question*):

Science Fair Project Question Checklist	
1. Your teacher may put some restrictions on projects. Have you met your teacher's requirements?	Yes / No None
2. Is the topic interesting enough to read about, then work on for the next couple months?	Yes / No
3. Can you find at least 3 sources of written information on the subject?	Yes / No
4. Can you measure changes to the important factors (variables) using a number that represents a quantity such as a count, percentage, length, width, weight, voltage, velocity, energy, time, etc.? Or, just as good, are you measuring a factor (variable) that is simply present or not present? For example, • Lights **ON** in one trial, then lights **OFF** in another trial • **USE** fertilizer in one trial, then **DON'T USE** fertilizer in another trial	Yes / No
5. Can you design a "fair test" to answer your question? In other words, can you change only one factor (variable) at a time, and control other factors that might influence your experiment, so that they do not interfere?	Yes / No
6. Is your experiment safe to perform?	Yes / No
7. Do you have all the materials and equipment you need for your science fair project, or will you be able to obtain them quickly and at a very low cost?	Yes / No
8. Do you have enough time to do your experiment more than once before the science fair?	Yes / No
9. If you are planning to enter a science fair outside of your school: (DC STEM FAIR) • Does your project meet all the rules and requirements for the science fair? • Have you checked to see if your science fair project will require approval from the fair before you begin experimentation?	Yes / No Yes / No

I have discussed the project idea and the checklist with my parent(s) and I am willing to commit to following through on this project.

_____

Student Signature **Date**

I have discussed the project idea and the checklist with my student and I believe he or she can follow through with this project.

_____

Parent Signature **Date**